UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,200	03/11/2004	Sujata Banerjee	200309497-1	4733

22879 7590 02/05/2008

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER	
FAN, HUA	

ART UNIT	PAPER NUMBER
4134	

NOTIFICATION DATE	DELIVERY MODE
02/05/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

JERRY.SHORMA@HP.COM
mkraft@hp.com
ipa.mail@hp.com

Office Action Summary	Application No.	Applicant(s)	
	10/797,200	BANERJEE ET AL.	
	Examiner	Art Unit	
	HUA FAN	4134	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/11/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 31-36 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 31-36 is drawn to functional descriptive material recorded on a computer-readable medium. Normally, the claim would be statutory. However, the specification, at paragraph [0123], lines 10-12 of PGPub, defines the claimed computer readable medium as encompassing statutory media such as a storage devices as well as non-statutory subject mater such as a "signal".

> A "signal" embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

Because the full scope of the claim as properly read in light of the disclosure encompasses non-statutory subject matter, the claim as a whole is non-statutory.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-8, 10-18, 20-27, 29-36 rejected under 35 U.S.C. 102(b) as being anticipated by HPL-2002-314R1 by Xu et al.

As to claim 1, HPL-2002-314R1 discloses a method of detecting a degradation of quality of service in a multicast tree in an application layer multicast network, the method comprising: detecting at a child node in the multicast tree a degradation of quality of service associated with a service being received at the child node; and determining whether the degradation of quality of service is resulting from a child-parent link or an upstream link in the multicast tree (section 2.3, lines 18-42).

As to claim 2, HPL-2002-314R1 discloses a method of selecting a new parent node for the child node in response to detecting the degradation of quality of service is resulting from the child-parent link (section 2.3, lines 24-33).

As to claim 3, HPL-2002-314R1 discloses a method of selecting a new parent node for a child node incident to the upstream link in response to detecting the degradation of quality of service is resulting from the upstream link (section 2.3, lines 34-42).

As to claim 4, HPL-2002-314R1 discloses a method of transmitting a complaint to the parent node, the complaint indicating a degradation of quality of service at the child node (section 2.3, lines 18-20); receiving a list of a set of candidate nodes in response to the degradation of quality of service resulting from the child-parent link; and selecting one of the candidate nodes as a new parent node for the child node (section 2.3, lines 24-32).

As to claim 5, HPL-2002-314R1 discloses a method of constructing a new service path in the multicast tree including the child node and the new parent node (section 2.3, lines 32-33; section 2.4, lines 14-18).

As to claim 6, HPL-2002-314R1 discloses a method of constructing a new service path further comprises: establishing a connection to the new parent node while maintaining a

connection to the parent node; synchronizing data received from the parent node and the new parent node; and terminating the connection to the parent node (section 2.4, lines 8-18).

As to claim 7, HPL-2002-314R1 discloses the method of selecting one of the candidate nodes as a new parent node for the child node comprises: measuring distances to each of the candidate nodes; determining a metric associated with the quality of service and each candidate node; and selecting one of the candidate nodes that is closest to the child node and that is operable to satisfy at least one quality of service characteristic (section 2.3, lines 30-32; section 2.2, lines 4-17).

As to claim 8, HPL-2002-314R1 discloses each of the candidate nodes is physically close to the child node (section 2.3, lines 27-29).

As to claim 10, HPL-2002-314R1 discloses detecting at a child node a degradation of quality of service comprises detecting a measured quality of service characteristic associated with the received service falling below a predetermined threshold (section 2.3, lines 14-19).

As to claim 11, HPL-2002-314R1 discloses detecting at a child node a degradation of quality of service comprises detecting degradation of quality of service as perceived by a user at the child node (section 2.3, lines 14-19; section 1, lines 64-65).

As to claim 12, HPL-2002-314R1 discloses quality of service includes at least one of a metric associated with processing data at a node receiving the service and a metric associated with transmitting data for the service between nodes in the multicast tree (section 2.2, lines 11).

As to claim 13, HPL-2002-314R1 discloses determining at the parent node whether quality of service associated with the service is degraded; transmitting a complaint to the parent node's parent node in the multicast tree indicating a degradation of quality of service at the parent

node in response to determining at the parent node that the quality of service is degraded; and requesting a list of a set of candidate nodes from a global information table in response to determining at the parent node that the quality of service is not degraded, wherein each of the candidate nodes is operable to provide the service to the child node and is physically close to the child node (section 2.3, lines 34-42).

As to claim 14, HPL-2002-314R1 discloses determining location of degradation of quality of service in a multicast tree in an application layer multicast network, the method comprising: receiving a complaint from a child node at a parent node in the multicast tree, the complaint indicating a degradation of quality of service of a service being received at the child node; and determining whether a cause of the degradation of quality of service is located in an upstream link or is located at a child-parent link (section 2.3, lines 18-42).

As to claim 15, HPL-2002-314R1 discloses determining whether a cause of the degradation of quality of service is located in an upstream link or is located at a child-parent link comprises: determining at the parent node whether quality of service associated with the service being received at the child node is degraded; transmitting a complaint to the parent node's parent node in the multicast tree indicating a degradation of quality of service at the parent node in response to determining at the parent node that the quality of service is degraded; and requesting a list of a set of candidate nodes from a global information table in response to determining at the parent node that the quality of service is not degraded, wherein each of the candidate nodes is operable to provide the service to the child node and is physically close to the child node (section 2.3, lines 24-42).

As to claim 16, HPL-2002-314R1 discloses requesting a list of a set of candidate nodes from a global information table comprises transmitting location information for the child node to a distributed hash table overlay network storing the global information table (section 2.1, lines 11-18; section 2.2, lines 7-9).

As to claim 17, HPL-2002-314R1 discloses the global information table includes at least location information and information associated with services provided by nodes in the application layer multicast network (section 2.1, lines 32-39).

As to claim 18, HPL-2002-314R1 discloses the global information table is stored in a plurality of distributed hash table nodes in the distributed hash table overlay network, such that each distributed hash table node stores information for nodes physically close in an underlying physical network (section 2, lines 8-16).

As to claim 20, HPL-2002-314R1 discloses the global information table stores information for nodes transmitting a complaint, the method comprising: searching the global information table for the set of candidate nodes such that the set of candidate nodes does not include a node that transmitted a complaint (section 2.1, lines 11-16).

As to claim 21, HPL-2002-314R1 discloses determining whether to reconfigure a multicast tree in an application layer multicast network, the method comprising: detecting an occurrence of a predetermined condition in the application multicast network, wherein the predetermined condition is stored in a global information table stored in distributed hash table nodes in the network; and determining whether to reconfigure the multicast tree in response to detecting the occurrence of the predetermined condition (section 2.3, lines 14-20).

As to claim 22, HPL-2002-314R1 discloses determining whether to reconfigure the multicast tree comprises determining whether reconfiguring the multicast tree improves quality of service for a node in the multicast tree (section 2.2, lines 9-13).

As to claim 23, HPL-2002-314R1 discloses reconfiguring the multicast tree in response to determining that reconfiguring the multicast tree improves quality of service for a node in the multicast tree (section 2.2, lines 14-17).

As to claim 24, HPL-2002-314R1 discloses a node in a multicast tree, the node comprising: means for detecting a degradation of quality of service associated with a service being received at the node; and means for transmitting a complaint to a parent node of the node in the multicast tree, the complaint indicating a degradation of quality of service at the child node (section 2.3, lines 14-20).

As to claim 25, HPL-2002-314R1 discloses means for receiving a list of a set of candidate nodes in response to the degradation of quality of service resulting from a child-parent link; and means for selecting one of the candidate nodes as a new parent node for the child node (section 2.3, lines 24-29).

As to claim 26, HPL-2002-314R1 discloses means for receiving notification of an occurrence of a predetermined condition; and means for determining whether to reconfigure the multicast tree in response to the occurrence of the predetermined condition (section 2.3, lines 18-20).

As to claim 27, HPL-2002-314R1 discloses a parent node connected to a child node in a multicast tree, the parent node comprising: means for receiving a complaint from the child node, the complaint indicating a degradation of quality of service of a service being received at the

child node; and means for determining whether quality of service associated with the service is degraded at the parent node; means for transmitting a complaint to the parent node's parent node in the multicast tree indicating a degradation of quality of service at the parent node in response to determining at the parent node that the quality of service is degraded; and means for requesting a list of a set of candidate nodes from a global information table in response to determining at the parent node that the quality of service is not degraded, wherein each of the candidate nodes is operable to provide the service to the child node and is physically close to the child node (section 2.3, lines 18-42).

As to claim 29, see similar rejection to claim 17.

As to claim 30, see similar rejection to claim 18.

As to claim 31, see similar rejection to claim 1.

As to claim 32, HPL-2002-314R1 discloses computer software embedded on a computer readable medium, the computer software comprising instructions performing: selecting a new parent node for the child node in response to detecting the degradation of quality of service is resulting from the child-parent link (section 2.3, lines 24-33).

As to claim 33, HPL-2002-314R1 discloses computer software embedded on a computer readable medium, the computer software comprising instructions performing: selecting a new parent node for a child node incident to the upstream link in response to detecting the degradation of quality of service is resulting from the upstream link (section 2.3, lines 34-42).

As to claim 34, HPL-2002-314R1 discloses computer software embedded on a computer readable medium, the computer software comprising instructions performing: transmitting a complaint to the parent node, the complaint indicating a degradation of quality of service at the

child node; receiving a list of a set of candidate nodes in response to the degradation of quality of service resulting from the child-parent link; and selecting one of the candidate nodes as a new parent node for the child node (section 2.3, lines 18-33).

As to claim 35, see similar rejection to claim 21.

As to claim 36, see similar rejection to claim 22 and claim 23.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over HPL-2002-314R1 by *Xu et al.* in view of US Pub 2004/0156384 to Rune at al..

As to claim 9, *HPL-2002-314R1* discloses determining whether the complaint timed out. However, it does not expressly disclose retransmit the complaint if timeout occurs. *Rune at al.* discloses retransmitting the request when timeout occurs ([0090], lines 1-6).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the teaching of *HPL-2002-314R1* regarding determining whether complaint timed out with the teaching of Rune et al. regarding retransmitting the request when timeout occurs. The rational would have been to increase the reliability of the protocol, as exemplified in Rune et al.

5. Claims 19, 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over HPL-2002-314R1 by *Xu et al.* in view of HPL-2002-126R2 by Xu et al.

As to claim 19, *HPL-2002-314R1* discloses requesting a list of a set of candidate nodes from the global information table for the child node. However, *HPL-2002-314R1* does not expressly disclose hashing a landmark vector of the child node to identify a distributed hash table node to transmit the request. HPL-20020126R2 discloses hashing a landmark vector of the node to identify a distributed hash table node (section III A 2, lines 24-27).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the teachings of HPL-*2002-314R1* regarding requesting a list of a set of candidate nodes from the global information table for the child node with the teachings of HPL-2002-126R2 regarding hashing a landmark vector of the node to identify a distributed hash table node. The suggestion/motivation would have been to establish connections with nodes in its physical proximity that are situated near network access points such as gateways or routers, that are highly available, and that have good fan-outs and forwarding capacities (HPL-2002-126R2, section III, lines 1-5).

As to claim 28, see similar rejection to claim 19.

6. Claims 1-5, 10,12, 14, 24, 31-33 rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2003/0012132 by Novaes et al., in view of "Construction of an Efficient Overlay Multicast Infrastructure for Real-time Applications" by Banerjee et al.

As to claim 1, Novaes et al. discloses a method of detecting a degradation of quality of service in a multicast tree in a multicast network ([0071], lines 10-17), the method comprising: detecting at a child node in the multicast tree a degradation of quality of service associated with a

service being received at the child node ([0071], lines 10-17); and determining whether the degradation of quality of service is resulting from a child-parent link or an upstream link in the multicast tree ([0063], lines 1-15). However Novaes et al does not expressly disclose an application-level multicast tree. Banerjee et al. discloses a method of constructing and adapting an application level multicast tree based on quality of service (page3, left col., lines 24-32).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. regarding detecting a degradation of quality of service in a multicast tree in a multicast network with constructing and adapting an application level multicast tree based on quality of service, disclosed by Banerjee et al.. The suggestion/motivation would have been using application-level multicasting architecture relieves the access bottleneck at the server(s) (Banerjee et al., page 1, right col., lines 18-20).

As to claim 2, Novaes et al discloses a method of selecting a new parent node for the child node in response to detecting the degradation of quality of service is resulting from the child-parent link ([0063] , lines 10-13).

As to claim 3, Novaes et al discloses a method of selecting a new parent node for a child node incident to the upstream link in response to detecting the degradation of quality of service is resulting from the upstream link ([0063], lines 10-13).

As to claim 4, Novaes et al discloses a method of transmitting a complaint to the parent node, the complaint indicating a degradation of quality of service at the child node; receiving a list of a set of candidate nodes in response to the degradation of quality of service resulting from the child-parent link; and selecting one of the candidate nodes as a new parent node for the child node ([0071], lines 14-17; [0065], lines 12-15; [0063], lines 10-15).

As to claim 5, Novaes et al discloses a method of constructing a new service path in the multicast tree including the child node and the new parent node ([0065], lines 12-15).

As to claim 10, Novaes et al discloses detecting at a child node a degradation of quality of service comprises detecting a measured quality of service characteristic associated with the received service falling below a predetermined threshold ([0071], lines 10-17).

As to claim 12, Novaes et al discloses quality of service includes at least one of a metric associated with processing data at a node receiving the service and a metric associated with transmitting data for the service between nodes in the multicast tree ([0071], lines 10-17).

As to claim 14, Novaes et al discloses determining location of degradation of quality of service in a multicast tree in an application layer multicast network, the method comprising: receiving a complaint from a child node at a parent node in the multicast tree, the complaint indicating a degradation of quality of service of a service being received at the child node; and determining whether a cause of the degradation of quality of service is located in an upstream link or is located at a child-parent link ([0071], lines 10-17; [0063], lines 1-15).

As to claim 24, Novaes et al discloses a node in a multicast tree, the node comprising: means for detecting a degradation of quality of service associated with a service being received at the node; and means for transmitting a complaint to a parent node of the node in the multicast tree, the complaint indicating a degradation of quality of service at the child node ([0071], lines 10-17; [0063], lines 1-15).

As to claim 31, Novaes et al. discloses computer software embedded on a computer readable medium, the computer software comprising instructions performing: detecting at a child node in a multicast tree a degradation of quality of service associated with a service being

received at the child node; and determining whether the degradation of quality of service is resulting from a child-parent link or an upstream link in the multicast tree ([0071], lines 10-17; [0063], lines 1-15).

As to claim 32, Novaes et al discloses computer software embedded on a computer readable medium, the computer software comprising instructions performing: selecting a new parent node for the child node in response to detecting the degradation of quality of service is resulting from the child-parent link ([0071], lines 10-17; [0063], lines 1-15).

As to claim 33, Novaes et al discloses computer software embedded on a computer readable medium, the computer software comprising instructions performing: selecting a new parent node for a child node incident to the upstream link in response to detecting the degradation of quality of service is resulting from the upstream link ([0071], lines 10-17).

7. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2003/0012132 by Novaes et al., in view of "Construction of an Efficient Overlay Multicast Infrastructure for Real-time Applications" by Banerjee et al., as applied to claim 1 above, and further in view of "Application Level Hand-off Support for Mobile Media Transcoding Sessions" by Roy et al..

As to claim 6, Novaes et al. as modified by Banerjee et al. does not teach establishing a connection to the new parent node while maintaining a connection to the parent node, synchronizing data received from the parent node and the new parent node, or terminating the connection to the parent node. Roy et al. discloses above functions (hand-off process, page 97, section 4, lines 24-31).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the hand-off process disclosed by Roy et al.. The suggestion/motivation would have been to solve the problem when the movement of a client causes the current transcoding server to be inefficient for the client's new location (Roy et al., page 97, section 4, lines 1-4).

8. Claim 7-8, 13, 15-18, 20-23, 25-27, 34-36 rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2003/0012132 by Novaes et al., in view of "Construction of an Efficient Overlay Multicast Infrastructure for Real-time Applications" by Banerjee et al., as applied to claim 1 above, and further in view of "Building Topology-Aware Overlays using Global Soft-state" (HPL-2002-281) by Xu et al..

As to claim 7, HPL-2002-281 discloses the method of selecting one of the candidate nodes as a new parent node for the child node comprises: measuring distances to each of the candidate nodes; determining a metric associated with the quality of service and each candidate node; and selecting one of the candidate nodes that is closest to the child node and that is operable to satisfy at least one quality of service characteristic (section 1, lines 67-70; section 6, lines 1-3).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method of selecting candidate nodes disclosed by HPL-2002-281. The suggestion/motivation would have been to take advantage of the condition of the underlying physical network and effectively utilizes physical proximity information (HPL-2002-281, section 1, lines 5-9), and to achieve both efficiency and accuracy (HPL-2002-281, section 1, line 70).

As to claim 8, HPL-2002-281 discloses each of the candidate nodes is physically close to the child node (section 1, lines 76-82).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method disclosed by HPL-2002-281. The suggestion/motivation would have been to effectively take advantage of the conditions of the underlying physical network (HPL-2002-281, section 1, lines 5-6).

As to claim 13, Novaes et al discloses determining at the parent node whether quality of service associated with the service is degraded; transmitting a complaint to the parent node's parent node in the multicast tree indicating a degradation of quality of service at the parent node in response to determining at the parent node that the quality of service is degraded ([0071], lines 10-17). Novaes et al., however, does not teach requesting a list of a set of candidate nodes from a global information table in response to determining at the parent node that the quality of service is not degraded, wherein each of the candidate nodes is operable to provide the service to the child node and is physically close to the child node. HPL-2002-281 instead discloses a mechanism to provide above functions (section 1, lines 67-70; section 6, lines 1-3).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method of selecting candidate nodes disclosed by HPL-2002-281. See similar motivation in claim 7 rejection.

As to claim 15, Novaes et al discloses determining whether a cause of the degradation of quality of service is located in an upstream link or is located at a child-parent link comprises:

determining at the parent node whether quality of service associated with the service being received at the child node is degraded; transmitting a complaint to the parent node's parent node in the multicast tree indicating a degradation of quality of service at the parent node in response to determining at the parent node that the quality of service is degraded ([0071], lines 10-17; [0063], lines 1-15). Novaes et al. however, does not teach requesting a list of a set of candidate nodes from a global information table in response to determining at the parent node that the quality of service is not degraded, wherein each of the candidate nodes is operable to provide the service to the child node and is physically close to the child node. HPL-2002-281 instead discloses a mechanism to provide above functions (section 1, lines 67-70; section 6, lines 1-3).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method disclosed by HPL-2002-281. See similar motivation in claim 7 rejection.

As to claim 16, HPL-2002-281 discloses requesting a list of a set of candidate nodes from a global information table comprises transmitting location information for the child node to a distributed hash table overlay network storing the global information table (section 1, lines 67-70, 73-82, 91-93).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method of selecting candidate nodes disclosed by HPL-2002-281. See similar motivation in claim 7 rejection.

As to claim 17, HPL-2002-281 discloses the global information table includes at least location information and information associated with services provided by nodes in the application layer multicast network (section 1, lines 73-82, 91-93; section 6, lines 1-3).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method disclosed by HPL-2002-281. See similar motivation in claim 7 rejection.

As to claim 18, HPL-2002-281 discloses the global information table is stored in a plurality of distributed hash table nodes in the distributed hash table overlay network, such that each distributed hash table node stores information for nodes physically close in an underlying physical network (section 1, lines 73-82, 91-93).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method disclosed by HPL-2002-281. See similar motivation in claim 7 rejection.

As to claim 20, HPL-2002-281 et al discloses the global information table stores information for nodes transmitting a complaint, the method comprising: searching the global information table for the set of candidate nodes such that the set of candidate nodes does not include a node that transmitted a complaint (section 1, lines 67-70).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method disclosed by HPL-2002-281. See similar motivation in claim 7 rejection.

As to claim 21, Novaes et al discloses determining whether to reconfigure a multicast tree in an application layer multicast network, the method comprising: detecting an occurrence of a

predetermined condition in the application multicast network and determining whether to reconfigure the multicast tree in response to detecting the occurrence of the predetermined condition ([0071], lines 10-17). Novaes et al., however does not teach the predetermined condition is stored in a global information table stored in distributed hash table nodes in the network. HPL-2002-281 discloses the predetermined QoS condition can be stored in a global information table in distributed hash table nodes in the network (section 1, lines 73-82; section 6, lines 1-3).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. with the method disclosed by HPL-2002-281. The suggestion/motivation would have been to provide a timely fix therefore maintain efficient routes (HPL-2002-281, section 1, lines 55-60).

As to claim 22, Novaes et al. discloses determining whether to reconfigure the multicast tree comprises determining whether reconfiguring the multicast tree improves quality of service for a node in the multicast tree ([0071], lines 10-17; [0063], lines 1-15).

As to claim 23, Novaes et al discloses reconfiguring the multicast tree in response to determining that reconfiguring the multicast tree improves quality of service for a node in the multicast tree ([0071], lines 10-17; [0063], lines 1-15).

As to claim 25, HPL-2002-281 discloses means for receiving a list of a set of candidate nodes in response to the degradation of quality of service resulting from a child-parent link; and means for selecting one of the candidate nodes as a new parent node for the child node (section 1, lines 64-70).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method of selecting candidate nodes disclosed by HPL-2002-281. See similar motivation in claim 7 rejection.

As to claim 26, Novaes et al discloses means for receiving notification of an occurrence of a predetermined condition; and means for determining whether to reconfigure the multicast tree in response to the occurrence of the predetermined condition ([0071], lines 10-17).

As to claim 27, Novaes et al discloses a parent node connected to a child node in a multicast tree, the parent node comprising: means for receiving a complaint from the child node, the complaint indicating a degradation of quality of service of a service being received at the child node; and means for determining whether quality of service associated with the service is degraded at the parent node; means for transmitting a complaint to the parent node's parent node in the multicast tree indicating a degradation of quality of service at the parent node in response to determining at the parent node that the quality of service is degraded ([0063], lines 1-15; [0071], lines 10-17). However, Novaes et al. does not teach requesting a list of a set of candidate nodes from a global information table in response to determining at the parent node that the quality of service is not degraded, wherein each of the candidate nodes is operable to provide the service to the child node and is physically close to the child node. HPL-2002-281 discloses a mechanism to provide above functions (section 1, lines 64-82).

As to claim 34, Novaes et al discloses computer software embedded on a computer readable medium, the computer software comprising instructions performing: transmitting a complaint to the parent node, the complaint indicating a degradation of quality of service at the

child node ([0071], lines 10-17). However Novaes et al. does not expressly disclose receiving a list of a set of candidate nodes in response to the degradation of quality of service resulting from the child-parent link; and selecting one of the candidate nodes as a new parent node for the child node. HPL-2002-281 discloses a mechanism to provide above functions (section 1, lines 64-82).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method of selecting candidate nodes disclosed by HPL-2002-281. See similar motivation in claim 7 rejection.

As to claim 35, see similar rejection to claim 21.

As to claim 36, see similar rejection to claim 22 and claim 23.

9. Claim 11 rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2003/0012132 by Novaes et al., in view of "Construction of an Efficient Overlay Multicast Infrastructure for Real-time Applications" by Banerjee et al., as applied to claim 1 above, and further in view of US Pub 2005/0157660 by Mandato et al.

As to claim 11, Novaes et al discloses detecting at a child node a degradation of quality of service ([0071], lines 10-17); however, it does not expressly disclose the degradation of quality of service is perceived by users. Mandato et al., instead expressly discloses quality of services include user perceived quality of service ([0103]).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the method disclosed by Novaes et al. as modified by Banerjee et al., with the method of selecting candidate nodes disclosed by Mandato et al.. The suggestion/motivation of the combination would have been to provide current and intended network utilization, for

example, the expected destinations and traffic volumes in terms of application-level QoS contracts (Mandato et al., [0065]).

10. Claim 9 rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2003/0012132 by Novaes et al., in view of "Construction of an Efficient Overlay Multicast Infrastructure for Real-time Applications" by Banerjee et al., as applied to claim 1 above, and further in view of US Pub 2004/0156384 to Rune at al..

As to claim 9, Rune at al. discloses determining whether the complaint timed out and retransmitting the request when timeout occurs ([0090], lines 1-6).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the teaching of Novaes et al. with the teaching of Rune et al. regarding retransmitting the request when timeout occurs. The rational would have been to increase the reliability of the protocol, as exemplified in Rune et al.

11. Claims 19, 28-30 rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2003/0012132 by Novaes et al., in view of "Construction of an Efficient Overlay Multicast Infrastructure for Real-time Applications" by Banerjee et al., as applied to claim 1 above, and further in view of "Building Topology-Aware Overlays using Global Soft-state" (HPL-2002-281) by Xu et al.., and further in view of HPL-2002-126R2 by Xu et al.

As to claim 19, *HPL-2002-281* discloses requesting a list of a set of candidate nodes from the global information table for the child node (section 1, lines 64-70). However, *HPL-2002-281* does not expressly disclose hashing a landmark vector of the child node to identify a distributed hash table node to transmit the request. HPL-20020126R2 discloses hashing a

landmark vector of the node to identify a distributed hash table node (section III A 2, lines 24-27).

At the time of invention, it would have been obvious to a person of ordinary skilled in the art to combine the teachings of HPL-*2002-281* regarding requesting a list of a set of candidate nodes from the global information table for the child node with the teachings of HPL-2002-126R2 regarding hashing a landmark vector of the node to identify a distributed hash table node. The suggestion/motivation would have been to establish connections with nodes in its physical proximity that are situated near network access points such as gateways or routers, that are highly available, and that have good fan-outs and forwarding capacities (HPL-2002-126R2, section III, lines 1-5).

As to claim 28, see similar rejection to claim 19.

As to claim 29, see similar rejection to claim 17.

As to claim 30, see similar rejection to claim 18.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUA FAN whose telephone number is (571)270-5311. The examiner can normally be reached on M-F 7:30am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Derrick Ferris can be reached on (571) 272-3123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. F./
Examiner, Art Unit 4134

/Derrick W Ferris/
Supervisory Patent Examiner, Art Unit 4134